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BUREAU OF  
ENTOMOLOGY AND PLANT QUARANTINE  
UNITED STATES DEPARTMENT OF AGRICULTURE

OUTLINE OF CONTROL PROGRAMS  
OF THE  
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE  
UNITED STATES DEPARTMENT OF AGRICULTURE

March 20, 1939.

All of the action programs of this Bureau, excluding quarantine and regulatory activities, are aimed at the control of insect pests and plant diseases. These programs may be conducted entirely with Federal funds under the regular appropriation, with regularly appropriated funds supplemented by funds from general emergency appropriations, or with regularly appropriated Federal funds supplemented by cooperation with State agencies, counties, or individuals. The activities are diverse and are limited to areas in which the insect pest or plant disease is an important agricultural problem--either from the standpoint of its direct damage to the area affected or because of its potential threat to areas outside of the infested or infected areas. These programs are briefly reviewed below, giving for each activity the purpose, the method and the scope as indicated by a list of States in which each program is being conducted. More detailed information may be obtained from the State Entomologist, who can supply such information direct or make reference to an appropriate Bureau representative. Attention is directed to the fact that there are many insect control programs which may be considered of an action nature which are not directly subsidized by Federal or State funds but depend on the initiative of the individual in following recommendations and in uniting with his neighbors in conducting insect control under the direction of extension and State entomologists. Consideration of including such programs in unified county programs where they are applicable is desirable.

#### 1 GRASSHOPPER CONTROL

Purpose: This activity is aimed at eliminating crop losses caused by grasshoppers and at reducing infestations. It is limited to areas where grasshoppers are in outbreak or incipient outbreak stage. It is financed from special appropriation by Congress, supplemented by contributions from States and counties and from individual farmers through provision for supervision, labor, transportation, mixing, and bait storage facilities.

Method: The Federal Government purchases and lays down at railway destination points poisoned bait materials free of charge to be mixed and distributed by counties and farmers in States having an approved organization and according to a definite plan of procedure. In certain special cases the Federal Government may also provide storage and mixing facilities. The program is supervised cooperatively by the Bureau of Entomology and Plant Quarantine and the States.





Scope: The States shown by survey to have important infestations and in which control operations will be necessary in 1939 unless weather unfavorable to grasshoppers intervenes are listed below:

Arizona	Nebraska
Arkansas	Nevada
California	New Mexico
Colorado	North Dakota
Idaho	Oklahoma
Illinois	Oregon
Iowa	South Dakota
Kansas	Texas
Michigan	Utah
Minnesota	Washington
Missouri	Wisconsin
Montana	Wyoming

This is a program which is of primary importance in most of the Central and Northern Great Plains States under conditions of infestation such as have occurred during the past five years. Almost any county selected in these States under the conditions of infestation indicated for 1939 will have a sufficiently severe infestation to justify careful consideration of a grasshopper control program in any general planning for the county. Prevention of damage and proper control involve considerations with regard to planting nonsusceptible crops and with regard to time and nature of plowing and cultivation. Consideration not only by entomological agencies but also by those concerned with crop rotations and soil conservation is required. Grasshopper control is of particular interest to soil conservationists because of the cultivation operations involved in certain areas and because of the direct damage which grasshoppers cause to certain seeded soil-building crops and to range coverage, which increases erosion.

#### MORMON CRICKET CONTROL

Purpose: The purpose of this activity is to afford crop protection from Mormon cricket attack. It does not include controlling these insects on range lands where they may occur abundantly and do severe damage except where such infestations threaten crops.

Method: This is a cooperative program between the Federal Government and the States and counties infested--the work being financed in part by Federal funds from a special appropriation and in part by funds supplied by State, county, or local agencies. The Federal Government will furnish supervision, labor for mixing the poisoned dust used in control, central storage for materials and equipment, oil for water barriers, dust materials or mixed dusts, and operators for power-dusters furnished by States, counties, or individuals but assigned to Federal supervision for use on a community basis. The States, counties, and cooperating individuals will supply all new dusting machinery, labor for operating hand dust-guns in areas where hand-dusting





is necessary (except in certain instances), all new barrier materials and all trailers, trucks, or other equipment for transporting power-dusters. Control involves dusting of migrating bands with sodium arsenite, either with power or hand dusters supplemented by the use of metal barriers across the migration, with trap pits at intervals, and oiling streams and ditches to kill the crickets attempting to cross.

Scope: Certain counties in the following States have been shown by survey to have serious Mormon cricket infestations which will require control in 1939: Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming, and possibly Nebraska.

#### SWEET-POTATO WEEVIL CONTROL

Purpose: Eradication of the sweet-potato weevil in commercial areas where hosts do not thrive throughout the year and prevention of spread to uninfested areas.

Method: In localities where infestations are located in commercial sweet-potato producing areas, effort is made to eradicate these infestations by the adoption of sanitary practices, including the clean-up of crop remnants, destruction of seed beds after the plants have been removed, and clean-up in and around storage beds, houses, and similar places where sweet potatoes are stored. These activities are carried on under State authority. State and Federal inspectors supervise and direct the operations. Labor required in carrying out the work is provided by local agencies, including growers, in the area where the work is done. State quarantines have been promulgated and are enforced to prevent infestation of new areas.

Scope: Control is under way in a limited number of counties in Alabama, Georgia, Mississippi, and Texas.

This program should be included in county programs if counties are selected where the weevil is active, as it causes serious losses to a staple crop, and marketing and movement of the crop from infested areas are restricted. As much as 75% reduction in infestations in Mississippi and 63% in Alabama have demonstrated the benefits to be derived from concerted well-directed action.

#### WHITE-FRINGED BEETLE CONTROL

Purpose: Suppression of infestations of the white-fringed beetle, leading to possible eradication, and prevention of spread by artificial means through enforcement of the Federal quarantine regulating the movements of products likely to carry the pest.

Method: Promulgation and enforcement of a Federal and supplementary State quarantine to prevent further spread. Enforcement of the Federal quarantine and the suppression and control work are conducted through funds appropriated by Congress, supplemented by funds from the State Plant Boards and assistance and contributions from local agencies and individuals in the infested States. Methods of control include utilization of crop rotations,







following, cultivation, insecticides, herbicides, and barriers around infested areas. Special treatments are required for nursery and greenhouse plants moving out of the infested area. Considerable acreages of severely infested land in some counties have been turned over to the Department for handling as needed to eliminate infestation.

Scope: Infestations occur and control is being conducted in the following States: Alabama (6 counties); Florida (3 counties); Louisiana (7 parishes); Mississippi (8 counties).

Although infestation and control activity are now restricted to a small area, this newly introduced pest has shown such potentialities for damage, particularly in Alabama and Florida, that its suppression is of great importance to agriculture. Should counties be selected for the unified program in infested areas, special attention should be paid to crop rotations, as certain crops are unfavorable to the development of high populations and others materially increase the hazards. Losses have been so severe in certain counties as to result in complete abandonment of farms.

#### GYPSY MOTH CONTROL AND PREVENTION OF SPREAD

Purpose: The prevention of spread of the gypsy moth from infested areas through the regulation of products likely to cause its spread by artificial means; cooperating with State agencies in the eradication of outlying infestations; and the preventing of natural spread by the maintenance of an area referred to as a barrier zone in which all infestations will be located and exterminated.

Method: The prevention of artificial spread involves the enforcement of a Federal quarantine in cooperation with State agencies. Funds for this purpose are provided through regular appropriations made by Congress. The work to control infestations in outlying areas and to locate and eradicate those in the barrier zone is carried on through regular appropriations made by Congress and with funds made available by the Works Progress Administration, supplemented by those supplied by cooperating State agencies. The control of infestations in outlying areas includes intensive inspections to locate the presence of the moth, the destruction of the egg clusters and the spraying operations to kill the immature stages. The work in the barrier zone includes intensive inspections to discover all infestations. Operations to kill the insects, either in the egg or larval stages, involve the destruction of egg clusters by creosote or other means and the application of spray. It is known that the removal of a certain percentage of the preferred food plants of the gypsy moth holds the infestation in check and reduces damage. For this reason, selective thinning of the forest stand is made a part of the control program in the outlying infested areas and in the barrier zone. This also permits thinning of plant growth which allows more effective inspection and control procedure.







Control in the generally infested area is left to State and local agencies which are conducting work aimed at eliminating infestations and reducing defoliation of shade and forest trees in these areas.

Scope: The Federal quarantine covers that part of the New England States where infestation is general. The main outlying infestation occurs in parts of Pennsylvania and in an area on Long Island in the vicinity of New York. The barrier zone is an area from 20 to 30 miles in width extending from Long Island Sound to the Canadian line, including the eastern part of New York and the western part of Connecticut, Massachusetts, and Vermont.

The elimination of a certain percentage of favorable hosts from the forest stand will reduce and in some cases entirely prevent serious defoliation. Consideration should be given to this type of treatment as a means of permanent control in any counties in which infestation occurs where the unified program includes improvement of woodlots or forest areas.

#### PINK BOLLWORM CONTROL

Purpose: To prevent the spread within the United States of the pink bollworm by artificial means to eradicate infestations that may be detected in the main Cotton Belt, and to carry on other operations to protect the cotton interests of the United States from the menace of this pest.

Method: The prevention of spread by artificial means involves the enforcement of a Federal quarantine regulating the movement of cottonseed and other products likely to carry this pest; the carrying on of other operations to reduce the abundance of the pest in infested areas. Infestation has been discovered in the wild cotton plants in southern Florida, especially on the Keys, and to eliminate this source of infestation an effort is being made to destroy these nonimportant plants and thus reduce the hazard of spread from this source. In the infested areas in the United States, particularly those in the Big Bend area, and the Lower Rio Grande and Coastal sections of Texas, suppressive measures are carried on which include early destruction of cotton plants and cotton remnants, and the regulation of the planting and harvesting dates. These operations are in addition to those requiring treatment of seed as a part of the process of ginning and special handling of cotton products in these areas.

Scope: Infestations of the pink bollworm in the United States are limited to restricted areas along or adjacent to the Mexican boundary. These include parts of Texas, New Mexico, and Arizona. In the major portion of this area the infestation is light but in the Big Bend area of Texas the infestation is heavy and causes crop losses. The lightly infested area includes Santa Cruz and Salt River Valleys in Arizona as well as a considerable portion of the area in New Mexico where cotton is produced. The most recently discovered infestation is that which occurs in the Lower Rio Grande Valley and Coastal Plains section of Texas and adjacent areas in Mexico.





The pink bollworm is the most destructive pest of cotton known and is generally established in all cotton-producing countries except the United States. Light infestations have been located in parts of the main Cotton Belt. By thorough, prompt, and vigorous action by the Department and co-operating States, these infestations have been eliminated. The menace it presents to the cotton culture of the United States is generally recognized and any unified program that is carried on in counties where infestations are known to occur should include thorough consideration as to operations that may have a bearing on the control or prevention of spread of this pest. Should counties be selected which are included in the area under quarantine on account of the pink bollworm, regulatory measures to prevent artificial spread may influence the handling and culture of the cotton crop.

#### JAPANESE BEETLE CONTROL

Purpose: Aside from the enforcement of regulatory measures to prevent and retard long distance spread by artificial means, the purpose of this activity is to suppress the beetle at points considerable distances from the generally infested area to prevent developing new centers of spread.

Method: The work is conducted under regular funds in cooperation with State and local agencies. In outlying areas where infestation is located and particularly where there is good reason to believe that the sections where grubs occur in the soil can be outlined, soil treatments may be applied to aid in reducing the number of beetles that appear the next season. In connection with such control measures, a large number of traps may be operated to reduce the number of beetles in these isolated centers of infestation. Work of this type has been carried on in St. Louis, Mo., Erie, Pa., and Chicago, Ill.

Scope: The Federal activity, aimed at control, is restricted to a number of isolated infestations occurring mostly in towns. Such infestations occur in Missouri, Indiana, Illinois, Ohio, North Carolina, South Carolina, and Georgia.

Although control of the Japanese beetle should be considered in a program involving counties in the heavily infested areas in New Jersey, Pennsylvania, Delaware, New York, and Maryland, it is unlikely that any of the Federal control activities would be of importance for inclusion in the unified control program unless such counties happen to include cities where outlying infestations occur.





## MEXICAN FRUITFLY CONTROL

Purpose: To control and prevent spread of the Mexican fruitfly to protect the fruit-growing areas in the United States from danger of infestation by this insect.

Method: The Federal work is conducted with funds provided under regular appropriations for this purpose. The movement of products likely to carry the pest from the infested section of the United States is regulated by Federal Plant Quarantine. Careful examinations are made of the citrus groves in the infested area and traps to detect the presence of fruitflies are operated. When the fruitflies are detected, a poison spray on which the adults may feed is applied in the groves to kill the adults prior to laying of eggs. The maintenance during the summer of a nonhost period, when fruits which may be attacked by the fly are not allowed to remain on the trees, is enforced. Provision is made for removal and destruction by approved practices of culls and dropped fruit, the maintenance of sanitary requirements in packing houses and similar places where fruit is handled from infested areas, and sterilization of fruit. This is a cooperative activity, the Federal work being supplemented by that done by State and local agencies.

Scope: Operations in the United States are limited to regulated area in the Lower Rio Grande Valley of Texas, including Brooks, Cameron, Hidalgo, Willacy, and part of Jim Wells Counties.

## CITRUS CANCER ERADICATION

Purpose: To provide for the eradication of the bacterial disease of citrus known as "citrus canker."

Method: This work is carried on in active cooperation with responsible agencies in the States concerned and growers in localities where the disease occurs. Intensive inspection of nurseries and citrus groves is made to locate all diseased trees. Such trees are then removed and destroyed. An attempt is being made to locate and destroy diseased trees in certain areas where citrus trees occur as voluntary or escape stands, and to eliminate seedlings from areas where infected trees have been removed. The work is supported by regular appropriation supplemented by allotments from the Works Progress Administration and contributions from State and local agencies.

Scope: As a result of the vigorous campaign which has been carried on against citrus canker in the past, it has been apparently eliminated from important commercial citrus areas; however, some isolated infections are still being discovered in parts of Louisiana and Texas. Although no infection is known to occur in commercial properties in these or other States, the States in which infection has occurred are maintaining a close inspection of all citrus properties.



## PHONY PEACH AND PEACH MOSAIC ERADICATION

Purpose: To provide for the control and eradication of two important virus diseases of peach, known as "phony peach" and "peach mosaic."

Method: Extensive scouting is conducted by trained inspectors to discover infected areas and to delimit their scope. When infections are found the diseased trees are removed and destroyed. The removal of diseased trees is done under authority of the cooperating States and with funds or means supplied by them and by growers or from emergency funds allotted to the Bureau for this purpose. Worthless abandoned or escaped host trees are located and destroyed when in proximity to commercial plantings. The work is supported by regular appropriations for this purpose, by allotments from appropriations for emergency relief, and by contributions from State and local agencies.

Scope: Infection with phony peach disease in most of the States is scattered with the exception of that which occurs in the main peach-producing areas of Georgia, Alabama, and Tennessee. Control operations are being conducted in the States of Alabama, Georgia, Arkansas, Oklahoma, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, and Texas.

Work on peach mosaic disease control is being conducted in Colorado, Utah, California, New Mexico, Arizona, Texas, and Oklahoma.

## BLISTER RUST CONTROL

Purpose: The purpose of this work is to suppress and control white-pine blister rust.

Method: Funds from regular appropriations to the Department of Agriculture are used to provide leadership and technical direction for campaigns conducted under funds made available from emergency sources; from funds available to the Forest Service, National Park Service, and Indian Service. The work is done in cooperation with State organizations, counties, towns, and individual landowners. The method of control consists of eradication of currants and gooseberries, which serve as carriers of the disease, and the application of measures to delay the spread of the disease into uninfected regions, including the enforcement of the Federal quarantine on white-pine blister rust.

Scope: The Department is cooperating in the control of blister rust with Governmental agencies, States, counties, townships, individuals, and other local agencies in the white-pine growing regions in California, Colorado, Connecticut, Delaware, Georgia, Idaho, Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.





White-pine blister rust control should be included in the program in counties which may be selected within the above-mentioned States wherever consideration of white-pine forested areas is involved.

#### DUTCH ELM DISEASE ERADICATION

Purpose: To eradicate Dutch elm disease from the United States and to prevent its spread into uninfected regions.

Method: The work includes scouting to locate the presence of the disease, the identification of suspected samples, and the removal and destruction of diseased trees. The effort toward eradication also includes the location and removal of dead and dying trees in which the beetles that carry the disease from tree to tree may breed. The work concerned with the removal of trees is carried on very largely by funds supplied by State or local agencies, and by the use of emergency funds provided to combat the disease. A Federal quarantine prohibits the movement of products likely to carry the disease from the infected area. Regular appropriations provide for administrative and supervisory phases of the work but the major part of the work done with Federal funds is provided for from allotments from emergency appropriations for relief.

Scope: Aside from scouting and inspection activities, this work is limited to northern New Jersey and small portions of the States of Connecticut, New York, and Pennsylvania. A few diseased trees were found in isolated areas at Indianapolis, Ind., Wiley Ford, W. Va., and Athens, Ohio, in 1938.

#### BARBERRY ERADICATION

Purpose: The purpose of this work is to control black stem rust of wheat, oats, barley, and rye, and to prevent the occurrence of epidemics of this disease through the eradication of the common barberry--the intermediate host of the black-stem rust fungus.

Method: This work consists of locating and destroying bushes of those species or varieties of barberry which serve as intermediate host of the fungus. Federal funds from regular appropriations are used largely for the supervision and coordination of the work of State and local agencies which assist in supplying labor and inspectors and share in the expense of scouting. During the past several years this work has been largely financed by special allotments of emergency funds available for relief. A Federal quarantine, prohibiting and regulating the movement of barberry plants, is enforced.

Scope: The work of eradicating rust-susceptible barberries is being conducted in the following States: Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Montana, Nebraska, North Dakota, Ohio, Pennsylvania, South Dakota, Virginia, West Virginia, Wisconsin, and Wyoming.







The work in some of these areas gives needed protection to local wheat-producing sections and is largely in the nature of campaigns for local control. Work done in certain other sections is of greater importance for the protection of the main wheat crop in other States than for local benefit; this is especially the case in Missouri where the work is centered in counties adjoining the Illinois and Iowa State Line.

The first of these is the fact that the  
population of the country is increasing  
rapidly. This is due to a number of  
causes, the most important of which are  
the high birth rate, the low death rate,  
and the immigration of people from  
other countries. The second of these  
is the fact that the country is becoming  
more and more industrialized. This is  
due to the fact that the country is  
rich in natural resources, and these  
resources are being developed. The third  
of these is the fact that the country  
is becoming more and more urbanized.  
This is due to the fact that the  
country is becoming more and more  
industrialized, and this is causing  
people to move from the countryside  
to the cities. The fourth of these  
is the fact that the country is becoming  
more and more educated. This is due  
to the fact that the country is becoming  
more and more industrialized, and this  
is causing people to move from the  
countryside to the cities. The fifth  
of these is the fact that the country  
is becoming more and more democratic.  
This is due to the fact that the  
country is becoming more and more  
industrialized, and this is causing  
people to move from the countryside  
to the cities. The sixth of these  
is the fact that the country is becoming  
more and more free. This is due to  
the fact that the country is becoming  
more and more industrialized, and this  
is causing people to move from the  
countryside to the cities. The seventh  
of these is the fact that the country  
is becoming more and more peaceful.  
This is due to the fact that the  
country is becoming more and more  
industrialized, and this is causing  
people to move from the countryside  
to the cities. The eighth of these  
is the fact that the country is becoming  
more and more prosperous. This is due  
to the fact that the country is becoming  
more and more industrialized, and this  
is causing people to move from the  
countryside to the cities. The ninth  
of these is the fact that the country  
is becoming more and more powerful.  
This is due to the fact that the  
country is becoming more and more  
industrialized, and this is causing  
people to move from the countryside  
to the cities. The tenth of these  
is the fact that the country is becoming  
more and more important. This is due  
to the fact that the country is becoming  
more and more industrialized, and this  
is causing people to move from the  
countryside to the cities.